

WHAT IS CLAIMED IS:

1. Polyethylene glycol-modified semiconductor nanoparticles comprising a structure having polyethylene glycol of a number average molecular weight of 300 to 20000 having a thiol group at one end, bonded via cadmium to II-VI semiconductor nanocrystals of a core-shell structure having a ZnX shell, wherein X stands for O, S, Se, or Te, wherein said semiconductor nanoparticles are water-soluble.

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2. The semiconductor nanoparticles of claim 1, wherein a core of said II-VI semiconductor nanocrystals is selected from the group consisting of CdS, CdSe, CdTe, ZnSe, and ZnTe.

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3. The semiconductor nanoparticles of claim 1, wherein said polyethylene glycol is hetero-bifunctional polyethylene glycol having a thiol group at one end and functional group (A) at the other end, wherein said functional group (A) is selected from the group consisting of aldehyde, hydroxyl, amino, and carboxyl groups.

4. The semiconductor nanoparticles of claim 3 further comprising a biomolecule having specific recognition bonded to said functional group (A) of the hetero-bifunctional polyethylene glycol.

5. A method for preparing semiconductor nanoparticles of claim 1, comprising reacting an aqueous solution of polyethylene glycol of a number average molecular weight of 300 to 20000 having a thiol group at one end, with a cadmium salt and II-VI semiconductor nanocrystals of a core-shell structure having a ZnX shell, wherein X stands for O, S, Se, or Te.
6. A method for preparing semiconductor nanoparticles of claim 1, comprising the steps of:
- (A-1) reacting an aqueous solution of polyethylene glycol of a number average molecular weight of 300 to 20000 having a thiol group at one end, with a cadmium salt; and
 - (B-1) reacting a reactant further with II-VI semiconductor nanocrystals of a core-shell structure having a ZnX shell, wherein X stands for O, S, Se, or Te.
7. A method for preparing semiconductor nanoparticles of claim 1, comprising the steps of:
- (A-2) adding cadmium to a surface of II-VI semiconductor nanocrystals of a core-shell structure having a ZnX shell, wherein X stands for O, S, Se, or Te, to obtain a solution of semiconductor nanocrystals having cadmium on their surface; and

(B-2) reacting said solution of semiconductor nanocrystals having cadmium on their surface with an aqueous solution of polyethylene glycol of a number average molecular weight of 300 to 20000 having a thiol
5 group at one end.

8. A material for biological diagnosis comprising semiconductor nanoparticles of claim 4.